at least one natural language processing module to parse the first text to extract a keyword;

a search engine to use the keyword as a search term and to return search results;

at least one language translator to automatically translate the keyword into a plurality of languages prior to input to the search engine and to automatically translate the search results into second text in the identified language when the search results are in a plurality of languages; and

at least one natural language generator to receive results to the command and to convert the second text into a natural language format according to the identified language.

34. The system of claim 33, further comprising at least one automatic summarization module to automatically summarize the second text prior to converting the second text into the natural language format.

35. The system of claim 33, further comprising at least one text to speech module to render the second text audibly to the user.

REMARKS

Reconsideration of the above referenced application in view of the following amendment and remarks is requested. Claims 1, 3-8, 13, 15-20, 25-28, 31, and 33-35 have been amended. Claims 2 and 14 have been cancelled. Existing claims 1, 3-13, and 15-35 remain in the application.

ARGUMENT

Claims 1-3, 5, 6, 9, 10, 12-15, 17, 18, 21, 22, 25, 26 and 28-30 are rejected under 35 USC 103(a) as being unpatentable over Junqua et al. (US 6,324,512)(hereinafter Junqua) in view of Cohen et al (EP 1 014 277)(hereinafter Cohen).

An embodiment of the present invention is a method and apparatus for a language independent, voice-based Internet or intranet search system. The present invention may be used to enrich the current Internet or intranet search framework by allowing users to search for desired information via their own native spoken languages. In one embodiment, the search system may accept voice input data from a user spoken in a conversational manner, automatically identify the language spoken by the user, recognize the speech in the voice input data, and conduct the desired search using the speech as input data for a search query to a search engine. To make the language independent voice-based search system even more powerful, several features may also be included in the system. Natural language processing (NLP) may be applied to extract the search terms from the naturally spoken query so that users do not have to speak the search terms exactly (thus supporting conversational speech). Machine translation may be utilized to translate search terms as well as search results across multiple languages so that the search space may be substantially expanded. Automatic summarization techniques may be used to summarize the search results if the results are not well organized or are not presented in a user-preferred way. Natural language generation and text to speech (TTS) techniques may be employed to present the search results back to the user orally in the user's native spoken language. The universal voice search concept of the present invention, once integrated with an Internet or intranet search engine, becomes a powerful tool for people speaking different languages to make use of information available on the Internet or an intranet in the most convenient

way. This system may promote increased Internet usage among non-English speaking people by making search engines or other web sites easier to use.

In order to more particularly recite the present invention, the limitations of claim 2 have been incorporated into claim 1. Claim 2 has been cancelled. Junqua is the primary reference relied on by the Examiner in rejecting the original claim 2. A thorough review of Junqua reveals that the cited reference teaches or suggests almost nothing about the invention as currently claimed.

Junqua describes an interactive electronic program guide system using spoken language. Users can speak their commands to the audio/video system directly or through the telephone or the Internet. If the system does not have enough information necessary to perform the user's command, it prompts the user for additional information by first forming text queries and then sending text queries to a speech synthesizer, which converts these text queries into synthesized speech. The synthesized speech is played back to the user through a signal processing module. These text queries are in fact clarifications to the user's command.

In Junqua's teaching, text queries are generated only when the system requires additional information from the user to complete the user command. They are totally different from the "results" in "receiving results to the command" as recited in claim 2, and they are not the same as the "second text" in claim 2 either.

The "results" in "receiving results to the command" as recited in claim 2 are search results from the search engine, which are results of performing a completed user command. If the user prefers to listen to the search results, they are converted into a second text in a natural language format, if necessary, through the automatic summarization module and the natural language generation module. Compared to the raw search results, this second text is more understandable when spoken. The second text is subsequently submitted to the text to speech module to be synthesized and further rendered to the user.

In the Office Action, the examiner cites col. 3, lines 1-17 of Junqua as teaching the limitations of claim 2. This is erroneous; Junqua does not teach anything about the invention as claimed. Since Junqua does not teach or suggest

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receiving results to the command and converting the results into a second text in a natural language format according to the identified language, Junqua does not teach or suggest amended claim 1. No prima facie case of obviousness has been made in the Office Action dated July 8, 2002 for claim 1, as amended. Therefore, the amended claim 1 is allowable as presented.

As to Claim 3, it depends from allowable claim 1. Therefore, Claim 3 is also allowable.

The Office Action relies on col. 3, lines 1-8 and col. 6, lines 30-46 of Junqua as teaching Claim 5. As mentioned above, <u>the "queries" (col. 3, lines 1-8 of Junqua) are system prompts for additional information to complete a user command</u>. The cited col. 6, lines 30-46 of Junqua teaches a natural language parsing process. The function of the natural language parser is to form a system understandable command based on the information in the user's spoken instructions. To achieve this goal, it uses a knowledge database and local and global parsers to extract key information to fill slots, or tags, in a frame structure of an acceptable command. However, it is not certain if the right tag information is extracted for each command. Several alternative candidates are identified for each tag, each assigned with a score or weight. The weight signifies how likely the tag information is correct. The overall weight for the entire frame structure of a command is calculated from weights of tags in the command frame. As a result, the output from the natural language parser is not a single command frame, but a list of ordered candidates. The candidate with the highest weight is on the top of the list. Usually only the top "N" candidates are selected to propogate through different processing stages. This is where the phrase "N-Best Candidates Selection" comes from.

In marked contrast, in claim 5 of the present invention, the key word is used as a search query to a search engine. The results are the search results coming

back from the search engine. In other words, the results are what the search engine has found.

Junqua's system does not teach or suggest these limitations in claim 5. Therefore, claim 5 is allowable as presented. In addition, claim 5 depends from allowable claim 1.

Claim 6 is rejected based on Junqua, specifically col. 3, lines 18-34. The cited text of Junqua describes how the system interacts with the user via spoken language. When a user speaks his command to the system, the actual command may be embedded in complex sentences. The natural language parser extracts the key information from sentences to form a command understandable by the system. Based on what is found from a current copy of the electronic program guide, the dialog manager formulates a response in text format understandable by the user. This text response is further synthesized by the speech synthesizer and played back to the user.

The limitations in claim 6, however, describe an automatic summerization module, which generates a <u>short summary (gist) for the search results,</u> if necessary. The user desired information may be scattered in very long search results. In this case, the automatic summarization module (36 in Fig. 1) produces a shorter summary of what has been found for the user. There are some other cases where automatic summarization proves very useful. For example, if the user prefers to listen to the search results while results include tables, graphs, or other unspeakable objects, the automatic summarization module, along with the natural language generation module, produces a summary text in a natural language format for contents in these unspeakable objects. This summary text is then presented to the user in the synthesized speech format through the text to speech module.

In the marked contrast, the summary (gist) provided by the automatic summarization module in the present invention is not the response, which tells the

user "that the program is, or is not, available for viewing on the requested day", in Junqua's system. These two different concepts are not even related. Throughout the entire patent, Junqua teaches or suggests nothing about automatic summarization. Therefore, claim 6 is allowable.

Claim 9 is rejected based on Junqua. The examiner considers claim 9 to be shown inherently from Junqua because Junqua uses TCP/IP protocols for Internet access. In Junqua's teaching, the Internet is only used as a transmission means for remote access to the television set (col. 1, lines 37-44; col. 2, lines 28-38). Such a use of the Internet is very limited and fundamentally different from the use of the Internet through a web browser as described in the present invention. The major function of using a web browser is to provide a large knowledge reservior, not merely a transmission mechanism. A web browser is the interface to this reservior. Although Junqua teaches about TCP/IP, Junqua teaches or suggests nothing about a web browser. Since TCP/IP existed for many years before a web browser was invented, a reference to TCP/IP does not inherently teach or suggest a web browser. Therefore, claim 9 is not inherent from the cited text of Junqua. Hence, claim 9 is allowable. In addition to such a difference, claim 9 depends on claim 1, which is allowable.

Claim 10 is rejected based on Junqua, specifically on col. 3, lines 1-16. This is erroneous. As mentioned above in the explanations regarding amended claim 1, the "queries" in Junqua's teaching are given to the user by the system in an effort to complete the user's command by prompting the user for additional information. In contrast, in the present invention, the search query is a query (or key word(s)) submitted to the search engine. The search query may be directly from the user's instructions, or extracted from the user's instructions through a various number of processing steps, which may include language identification, speech recognition, natural language processing, and machine translation as shown in Fig. 1 in the

present invention. The web browser used in the present invention is an interface to the described search system which operates over the Internet. The "queries" taught in Junqua's system are totally different from the "query" described in the present invention. Junqua teaches or suggests nothing about the limitations in claim 10. Claim 10 is, therefore, allowable.

The Office Action rejects claims 13-15 and 25-26 based on the same reasons used in the rejection of claims 1-3.

Claims 13 and 25 are amended to incorporate the additional limitations in the amended claim 1. Claim 14 is cancelled and its limitations are incorporated into the amended claim 13. Claims 13 and 25 now have limitations similar to claim 1. Because amended claim 1 is allowable, claims 13 and 25 are allowable for the same explanations stated above for claim 1. Depending from claim 13, claim 15 is allowable. Claim 26 depends from allowable claim 25 and is also allowable.

Claims 17-18, 21-22, and 28-30 are rejected for the same reasons used in the rejection of claims 5-6 and 9-10. Based on the above explanations regarding claims 5-6 and 9-10, claims 17-18, 21-22, and 28-30 are now allowable.

Claims 12 depends on claim 1 and claim 24 depends on claim 13. Both claim 1 and claim 13 are allowable based on the above explanation regarding claim 1 and 13. Claim 12 and 24 are thus also allowable.

Claims 4, 7, 8, 16, 19, 20, 27, 31, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junqua in view of Cohen, and further in view of Nosohara (EP 0 838 765) (hereinafter Nosohara).

Claims 4 and 7 are amended to recite that the translation of the keyword is automatic. The addition of the limitation thus differentiates claims 4 and 7 from Nosohara's teaching. The Office Action cites col. 3, lines 6-22 of Nosohara as teaching claims 4, 7, and 8. After reading the entire document carefully, however, it is clear Nosohara requires that the destination language be specifically selected

before the translation means can translate a key word from the searcher's native language (col. 4, lines 32-57 of Nosohara, reads on "the language used to define the search conditions is selected by the searcher and then the databases to be searched (destination language) are designated ..."). In other words, the selection of the destination language for the key word translation in Nosohara is performed manually by the user. Nosohara teaches or suggests nothing about the limitations in the amended claims 4 and 7, which recite automatic destination language selection and translation. The amended claims 4 and 7 are, therefore, now allowable. Depending on allowable claim 7, claim 8 is also allowable.

The Office Action rejects claims 16, 19, 20, 27, and 31 based on the same reasons used in the rejection of claims 4, 7, and 8. Based on the above explanations regarding claims 4, 7, and 8, claims 16, 19, 20, 27, and 31 are now allowable.

As for claim 33, it is rejected based on the same reasons used in the rejection of claims 4, 7, and 8. Claim 33 recites a language independent voice based search system which comprises a language identifier, at least one speech recognizer, at least one natural language processing module, a search engine, at least one language translator, and at least one natural language generator. The limitations presented in amended claims 1, 4, 7, and 8, which are allowable, are incorporated into claim 33. None of the cited arts (Junqua, Cohen, and Nosohara) in the Office Action teach or suggest even a general search engine, let alone a complex language independent voice based search system with a number of limitations as recited in claim 33. No prima facie case of obviousness has been made in the Office Action dated July 8, 2002 for claim 33. Therefore, claim 33 is allowable as presented.

Claim 34 is rejected for the same reasons used in the rejection of claims 2 and 6. Based on the above explanations regarding the claim 6 and original claim 2, claim 34 is also allowable. Claim 35, depending from claim 33, is also allowable.

Claims 11, 23, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Junqua in view of Cohen, and further in view of well known prior art (MPEP 2144.03).

Claim 11 depends on claim 9, claim 23 depends on claim 21, and claim 32 depends on claim 29. Based on the same reasons stated above for claims 9, 21, and 29, claims 11, 23, and 32 are also allowable because they depend from allowable claims.

CONCLUSION

In view of the foregoing, claims 1, 3-13, and 15-35 are all in condition for allowance. If the Examiner has any questions, the Examiner is invited to contact the undersigned at (503) 264-8074. Early issuance of Notice of Allowance is respectfully requested.

Respectfully submitted,

Dated: 9/12/02

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Version with markings to show changes made:

1. (once amended) A method of interfacing to a system comprising:

receiving voice input data from a user;

identifying a language spoken by the user from the voice input data;

converting the voice input data into a first text in the identified language by recognizing the user's speech in the voice input data based at least in part on the language identifier;

parsing the first text to extract a keyword;[and]

using the keyword as a command to an application;

receiving results to the command;

converting the results into a second text in a natural language format according to the identified language; and

rendering the second text for perception by the user.

2. Cancelled.

3. (once amended) The method of claim [2]1, wherein rendering comprises converting the second text into speech and rendering the speech to the user.

4. (once amended) The method of claim 1, further comprising automatically translating the keyword into a plurality of languages other than the identified language and using the translated keywords as the command.

5. (once amended) The method of claim [2]1, further comprising using the keyword as a search query to a search engine, wherein the results comprise search results from the search engine operating on the search query.

6. (once amended) The method of claim [2]1, further comprising automatically summarizing the results prior to converting the results to the second text.

7. (once amended) The method of claim [2]1, further comprising automatically translating the keyword into a plurality of languages other than the identified language and using the translated keywords as a search query to a search engine, wherein the results comprise search results from the search engine operating on the search query.

8. (once amended) The method of claim 7, further comprising automatically translating search results in languages other than the identified language into the identified language.

9. The method of claim 1, wherein the application comprises a web browser.

10. The method of claim 9, wherein the web browser interfaces with a search engine and the command comprises a search query.

11. The method of claim 9, wherein the web browser interfaces with a shopping web site and the command comprises at least one of a purchase order and a request for product information.

12. The method of claim 1, wherein the speech comprises conversational speech.

13. (once amended) An article comprising: a storage medium having a plurality of machine readable instructions, wherein when the instructions are executed by a processor, the instructions provide for interfacing to a system by receiving voice input data from a user, identifying a language spoken by the user from the voice input data, converting the voice input data into a first text in the identified language by recognizing the user's speech in the voice input data based at least in part on the language identifier, parsing the first text to extract a keyword, [and] using the keyword as a command to an application[.], receiving results to the command, converting the results into a second text in a natural language format according to the identified language, and rendering the second text for perception by the user.

14. Cancelled.

15. (once amended) The article of claim [14]13, wherein instructions for rendering comprise instructions for converting the second text into speech and rendering the speech to the user.

16. (once amended) The article of claim 13, further comprising instructions for automatically translating the keyword into a plurality of languages other than the identified language and using the translated keywords as the command.

17. (once amended) The article of claim [14]13, further comprising instructions for using the keyword as a search query to a search engine, wherein the

results comprise search results from the search engine operating on the search query.

18. (once amended) The article of claim [14]13, further comprising instructions for automatically summarizing the results prior to converting the results to the second text.

19. (once amended) The article of claim [14]13, further comprising instructions for automatically translating the keyword into a plurality of languages other than the identified language and using the translated keywords as a search query to a search engine, wherein the results comprise search results from the search engine operating on the search query.

20. (once amended) The article of claim 19, further comprising instructions for automatically translating search results in languages other than the identified language into the identified language.

21. The article of claim 13, wherein the application comprises a web browser.

22. The article of claim 21, wherein the web browser interfaces with a search engine and the command comprises a search query.

23. The article of claim 21, wherein the web browser interfaces with a shopping web site and the command comprises at least one of a purchase order and a request for product information.

24. The article of claim 13, wherein the speech comprises conversational speech.

25. (once amended) A language independent voice based user interface system comprising:

a language identifier to receive voice input data from a user and to identify the language spoken by the user;

[a]at least one speech recognizer to receive the voice input data and the language identifier and to convert the voice input data into first text based at least in part on the language identifier;

[a]at least one natural language processing module to parse the first text to extract a keyword; and

[a]at least one natural language generator to receive results to the command and to convert results into a second text [into]in a natural language format according to the identified language.

26. (once amended) The system of claim 25, further comprising [a]at least one text to speech module to render the second text audibly to the user.

27. (once amended) The system of claim 25, further comprising [a]at least one language translator to automatically translate the keyword into a plurality of languages, and to translate the second text into the identified language prior to converting the second text into the natural language format.

28. (once amended) The system of claim 25, further comprising [an]at least one automatic summarization module to automatically summarize the second text prior to converting the second text into the natural language format.

29. The system of claim 25, wherein the system is coupled to a web browser.

30. The system of claim 29, wherein the web browser interfaces with a search engine, the keyword comprises a search query for the search engine, and the second text comprises search results from the search engine.

31. (once amended) The system of claim 30, further comprising [a]at least one language translator to automatically translate the keyword into a first plurality of languages for use as the search query, and to automatically translate the second text into the identified language prior to converting the second text into the natural language format, the second text comprising text in a second plurality of languages.

32. The system of claim 29, wherein the web browser interfaces with a shopping web site and the keyword comprises at least one of a purchase order and a request for product information.

33. (once amended) A language independent voice based search system comprising:

a language identifier to receive voice input data from a user and to identify the language spoken by the user;

[a]at least one speech recognizer to receive the voice input data and the language identifier and to convert the voice input data into first text based at least in part on the language identifier;

[a]at least one natural language processing module to parse the first text to extract a keyword;

a search engine to use the keyword as a search term and to return search results;

[a]at least one language translator to automatically translate the keyword into a plurality of languages prior to input to the search engine and to automatically translate the search results into second text in the identified language when the search results are in a plurality of languages; and

[a]at least one natural language generator to receive results to the command and to convert the second text into a natural language format according to the identified language.

34. (once amended) The system of claim 33, further comprising [an]at least one automatic summarization module to automatically summarize the second text prior to converting the second text into the natural language format.

35. (once amended) The system of claim 33, further comprising [a]at least one text to speech module to render the second text audibly to the user.

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